

**Idaho Antidegradation Implementation
Discussion Paper
Tier II Alternatives Analysis
June 28, 2010**

Introduction

For high quality or Tier II waters, federal rules (40 CFR 131.12(a)(2)) require water “quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State’s continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.” (emphasis added)

This is echoed in Idaho’s current and proposed antidegradation policy in rule. Discharges or activities that have the potential to degrade high quality (Tier II) waters are thus subject to an antidegradation analysis that addresses both their necessity and socio-economic importance.

Alternatives analysis in antidegradation implementation stems from the word necessary in the above rule language. The question is not whether it is necessary to discharge or not, although that is a possibility that should be considered, but more a question of “is it necessary to discharge effluent of the quality proposed?” In other words, “What other less polluting alternatives are there? And if the least degrading option has not been chosen, why not?” These questions of whether there are less degrading, or perhaps non-degrading alternatives to the discharge or activity as proposed is the essence of necessity. The aim is to find the least degrading alternative that is feasible and affordable.

Usually much of the consideration of alternatives is done by those proposing the discharge early on in the design or even conceptual stage of a project. Thus a key challenge of antidegradation review is to encourage engagement with water quality regulators and consideration of pollution minimization as early as possible in the project design. If this is done then the effort will result in developing alternatives that will pass antidegradation analysis.

Although it may not be recognized as part of antidegradation implementation, many states maintain that early engagement in project design does now take place, at least for point source discharges, between agency and project engineers, for example facility planning and master planning review. Oregon in particular has stated that such early engagement alters project planning so as to minimize degradation. However, for most states this interaction appears to be informal, undocumented, or not necessarily conducted with an eye toward minimizing degradation of water quality. Inadequate documentation makes it difficult to show an antidegradation benefit from early consultations that may be taking place.

Principles of Alternatives Analysis

A core idea of antidegradation is that it is not necessary to pollute at the levels proposed if there are alternatives consistent with the purpose of the project that produce less pollution. Thus alternatives need to be evaluated. Finding the best alternative is not easy;

it will be constrained by technology based treatment standards already in existence and limited by wastewater treatment engineering practice. In addition discharger costs versus community benefit plays a big role in striking a balance between necessity for lowering water quality and accommodating socially and economically important projects. The goal of the following principles is to guide identification and selection of the least degrading alternative for project discharge that still meets social and economic needs of the community.

1st Principle: Early consideration of minimizing degradation is best. If alternatives which minimize degradation are considered at the earliest stages of project design, the project is less likely to be characterized as causing unnecessary degradation during agency and public review. This can avoid ensuing project delays for revision that a later finding of unnecessary degradation would cause. It is also the most efficient of everyone's time and resources to have only one project design and review cycle, one which integrates minimizing degradation from the start.

2nd Principle: Consider a full range of alternatives. The range of alternatives evaluated should not be limited to just wastewater treatment alternatives, but should also consider such things as process changes/efficiencies, location/relocation of discharge, and non-discharge alternatives such as wastewater reuse. In many cases this may mean 'thinking outside the box'. The only alternatives that can not be considered are those that do not comply with technology based effluent limitations, would not meet water quality criteria or would not protect existing or designated uses.

3rd Principle: Leave cost balancing to later. Initially the range of alternatives should be limited only by technological feasibility and not cost. This is because the least cost alternative is likely the most degrading alternative (e.g. no treatment or the minimum required by effluent limitation guidelines). Cost of the alternative should not be an initial filter. Just because an alternative may be cheaper for a discharger does not mean it is best for the community. Cost comes into play when selecting the best alternative, as discussed later.

4th Principle: Be aware of cross-pollutant and cross-media tradeoffs. Wastewater comes as a package of pollutant characteristics and maximizing treatment for one pollutant may not be the optimal solution to minimize overall water quality impact or broader environmental degradation. A classic example of cross-pollutant tradeoffs is the chlorination of wastewater effluent to eliminate bacterial pollution and the subsequent production of chloramines in the effluent. Example of a cross-media trade-off might be the production of a solid waste in an effort to remove a pollutant (phosphorus) from wastewater. A full accounting of costs will likely minimize adverse trade-offs, but only if such costs and trade-offs are thought of and taken into account in project planning.

Alternatives Analysis

Feasible alternatives should be ranked from least to most degrading of water quality. If the project manager opts for the least degrading option then the first test for allowing degradation is met, presuming an appropriate range of technologically feasible

alternatives were considered. If the least degrading option is not preferred then the next least-degrading alternative may still be justified on the basis of extenuating circumstances such as minimizing cross-pollutant / cross-media impacts or cost-effectiveness of improved pollutant reduction. After ranking by degree of degradation, a step-wise process can then begin that may justify elimination of less degrading alternatives by working down from the top of the list (least degrading) and stopping at the first alternative that can not legitimately be eliminated. It is in this process that economics enters the picture.

Treatment costs are not usually linear or infinitely adjustable, but rather often go in steps with different treatment processes. Treatment cost-effectiveness looks at the marginal cost of improved pollutant reduction and may allow the justification of the next least-degrading alternative if the incremental cost of improved treatment far outweighs the incremental gain in pollutant reduction. For example if the best alternative removes 99 lbs of a pollutant for \$5,000 per MGD and the second best removes 90 lbs of the pollutant for \$1,000 per MGD, then the cost of removing 99 lbs of pollutant is \$50.50/lb compared to just \$11.11/lb for the first 90 lbs. If this were the case it would likely be easy for the discharger to make the case that the marginal cost of treatment did not justify the improvement in water quality that would result and thus the next best alternative is acceptable.

Cost-effectiveness should not rule alone; it needs to be tempered by consideration of affordability and emerging practice in the industry. Consider the previous example further. If the third best alternative achieved 45 lbs of pollutant reduction at a cost of \$450 per MGD the cost per lb of treatment would be marginally better at \$10/lb, but the overall annual cost of \$1,000 per million gallons for removing 90 lbs versus \$450 per million gallons for 45 lbs may be quite affordable to the discharger. The added cost in better treatment should be weighed against the value of maintaining high water quality. In general, affordable reductions in pollution should not be forgone. If the \$1000 per MGD alternative is practiced by a similar modern discharge then the argument for the cheaper option becomes even weaker.

Gauging importance of economic and social development, should a project pass the necessity test, is addressed in a companion paper.

Other States

The adjacent states of MT, OR, WA & WY all address alternatives analysis in rule, but with varying level of detail. A fifth, Nevada, addresses it in statute. Three of the five use the word feasible or feasibility in connection with identification of alternatives. Oregon uses the phrase “all known, available, and reasonable” which may be equivalent. Nevada law calls for:

“the highest and best degree of waste treatment available under the existing technology, consistent with the best practice in the particular field under the conditions applicable.”

Oregon provides a list of “at minimum” alternatives to be considered, including “improved operation & maintenance, recycling and reuse, and land application”, while

Washington provides examples of alternatives which is quite similar to Oregon's minimum alternatives.

Only Montana's rules mention economics as part of the analysis, calling for:

“evaluating the cost effects of the proposed alternatives on the economic viability of the project and on the applicant by using standard and accepted financial analyses.”

Only Nevada addresses the timing of the alternatives analysis, by stating in law that antidegradation is looked at “as part of the initial design of the project or development”, though it is unclear how the Nevada Department of Environmental Protection is involved in ascertaining this is done. More detail is provided in Nevada's Continuing Planning Process.

Openness is addressed through public comment, though it appears this is typically done only as a matter of review once the agency has made an initial determination to go ahead and allow degradation, and as a part of normal permit review. Thus there is no model in adjacent states for involvement of the public in description and selection of alternatives. There is however a model in the NEPA environmental impact statement process where agencies such as the US Forest Service conduct public scoping meetings with the aim of developing a range of alternatives to be further analyzed. This is likely too cumbersome for antidegradation review, but perhaps the intent of it - to get at a full range of alternatives – can be somehow captured in Idaho rule or guidance.

Idaho Antidegradation Implementation Discussion Paper Point and Nonpoint Source Controls

Introduction

Before DEQ authorizes a point source to degrade water quality in a high quality water, Federal rules (40 CFR 131.12(a)(2)) and the Idaho water quality standards (WQS, IAC 58-0102 §051.02) require DEQ to assure that the “highest statutory and regulatory requirements for all new and existing point sources and cost-effective and reasonable best management practices (BMPs) for nonpoint source (NPS) control” will be achieved. This assurance is necessary because it would be inconsistent with the antidegradation philosophy to allow further degradation in a water body where there are compliance problems with point and nonpoint source activities.

Assuring that such controls are or will be achieved is not an easy undertaking. The objectives of this paper are to: 1) discuss the appropriate spatial extent of this assurance, 2) discuss what characterizes statutory and regulatory requirements for point sources as well as cost-effective and reasonable BMPs for NPS, 3) summarize how surrounding states are approaching these issues, and 4) provide recommendations on how DEQ should address these issues.

Spatial Applicability

When evaluating whether all point and nonpoint source activities are implementing their appropriate level of controls, DEQ must determine the appropriate spatial extent for such a review. Meaning, how far upstream and downstream should DEQ look? If a new point source proposes to discharge to the Snake River at Weiser, should DEQ require an evaluation of all point and nonpoint source activities affecting the Snake River from headwaters to mouth, including all of its tributaries? This vast of a spatial extent is not reasonable, just as only looking at the single point of discharge is not reasonable.

If it is desirable to establish a predetermined spatial extent for this review, DEQ can consider equating the area of review to an assessment unit (AU), water body identification (WBID) unit, or a hydrological unit. The AU option could be considered because DEQ conducts its support status determinations at the AU level. However, the AU level is not ideal because a 3rd order assessment unit ignores the first and second order tributaries which may be contributing the pollutant of concern. It would be reasonable to require the point source and NPS activity review on a WBID unit basis because beneficial uses are designated on the WBID unit scale. The 4th field hydrologic unit scale is likely not reasonable, as it would encompass a large geographic area, but smaller hydrologic units may make sense, especially if they are entire watersheds.

Alternative, DEQ may decide that it isn't necessary to establish a predetermined spatial extent for this review. Rather, DEQ will evaluate an appropriate spatial extent for this review on a case-by-case basis. The advantage to this approach is that it allows for consideration of the types of pollutants, discharges, and site conditions. The disadvantage to this approach is the possibility of inconsistent implementation throughout the state.

Proposed approach for rule

DEQ recommends reviewing point source and nonpoint source activities on a WBID unit basis (including those areas upstream and downstream of the discharge) unless it is determined that a larger spatial extent is necessary for a particular pollutant. For example, if a point source discharges nutrients into the Snake River near Idaho Falls, DEQ may determine that the review should include the American Falls Reservoir, even though the reservoir is considered a different WBID. DEQ recommends this be presented in antidegradation implementation guidance.

Highest Statutory and Regulatory Requirements for Point Sources

Before a point source is authorized to degrade water quality, DEQ must have assurance that other point source discharges to the water body are achieving the highest statutory and regulatory requirements. DEQ does not have NPDES primacy and Idaho has not established specific treatment requirements for point sources that exceed federal regulations. In fact, Idaho wastewater rules (IDAPA 58.01.16) state the “required degree of wastewater treatment shall be based on the effluent requirements and water quality standards established by the responsible state agency and appropriate federal regulations including discharge permit requirements.”

DEQ could consider adopting a requirement that dischargers apply all known, available, and reasonable treatment (AKART) methods. AKART may be interpreted to be equivalent to the federal regulations (effluent limitation guidelines) or it could be something more rigorous, depending on the situation. However, if anything more stringent than the federal regulations were put into rule, DEQ would have to justify the rule language according to Idaho Statute 39-107D. Furthermore, given that Idaho does not have NPDES permitting authority, it is uncertain as to whether EPA would incorporate AKART into their NPDES permits. In the past DEQ tried to adopt methods for developing water quality based effluent limits (WQBELs) in its WQS. These methods were less stringent than the federal methodology for developing WQBELs. In response to this effort, EPA stated, “EPA currently is responsible for developing, issuing and enforcing NPDES permits in Idaho. Therefore, we are not required to follow any implementation procedures that may be added to the State’s WQS....Until the State is authorized to run the [NPDES] program, EPA Region 10 will continue to follow the reasonable potential procedures it applies in all permits it issues in the region.”

Lacking any rules specifying the expected level of treatment technologies to be used, DEQ must rely upon federal regulations. At a minimum, the treatment technologies must comply with the effluent limitation guidelines in federal regulations and achieve applicable technology based effluent limits (TBELs). Where the TBELs are insufficient to meet water quality standards, then EPA must develop water quality based effluent limits (WQBELs), which may drive a discharger to install more advanced levels of treatment.

DEQ could assume the highest statutory and regulatory requirements for point sources are reflected in the terms and conditions of NPDES permits, which include TBELs and/or WQBELs. Some permits incorporate additional requirements that are associated with state-authorized compliance schedules. DEQ may conclude that an existing point source is

achieving the highest statutory and regulatory requirements if it is in compliance with its NPDES permit, including any compliance schedules.

In implementing this approach, DEQ must determine what constitutes “in compliance.” There are a variety of reasons why a facility can be deemed in violation of its permit, including such things as: failure to report, failure to have an operation and maintenance plan or quality assurance plan, exceeding effluent limitations, or failure to conduct instream water quality monitoring if it is required in the permit. In deciding what is considered “in compliance” from an antidegradation review perspective, DEQ must decide if it is desirable to implement a one-strike and you’re out approach, or to give consideration to the type of permit violation coupled with the frequency of violations. Should a facility be deemed in compliance for antidegradation purposes if it meets its effluent limitations at least 95% of the time? Should DEQ select a frequency that is based on how many years of data the facility has? Should DEQ limit the review of existing discharges to just the pollutant(s) of concern in the new or increased discharge or should DEQ review all of the pollutants of concern in existing discharges, regardless of what the new or increased discharge proposes? These are just a few of the issues that DEQ will need to address when establishing a process for evaluating whether existing point sources are achieving the highest statutory and regulatory requirements.

Proposed approach for rule

The current draft rule language does not provide any details regarding how DEQ will ensure existing point sources are achieving the highest statutory and regulatory requirements. Rather, we recommend these details be provided in antidegradation implementation guidance.

We recommend that DEQ conclude point sources are achieving the highest statutory and regulatory requirements when point sources are complying with the effluent limitations in their permits. We recommend that assessment of whether other point source discharges are complying with their permits only be conducted for pollutants of concern that a new or increased discharge is proposing. As an example, when reviewing a new discharge that would like to discharge phosphorus to a water body DEQ needs to evaluate whether other existing discharges to the WBID unit are complying with their phosphorus limitations, if any, and not other pollutant effluent limitations.

DEQ will consider a facility as not achieving the highest statutory and regulatory requirements if it is shown that the facility is not meeting its effluent limits for the pollutant(s) of concern. DEQ does not believe the application of a “one-strike, you’re out” approach is appropriate, rather, DEQ recommends there be some consideration of the frequency and nature of effluent limit violations. What frequency of effluent limitation violation is chosen should be discussed with the negotiated rulemaking committee and/or writers of the guidance document.

The applicant will be responsible for conducting this research for all permitted point source discharges within their area of review and providing a summary of this information to DEQ.

Most Cost-Effective and Reasonable Best Management Practices for NPS

The federal antidegradation regulations do not require states to establish BMPs for NPS activities where such BMPs do not already exist. However, for NPS activities with required BMPs, the federal antidegradation regulations require states to assure those BMPs are being implemented prior to authorizing degradation of high quality water by a point source (*Ohio Valley Environmental Coalition v. Horinko*, 279 F. Supp.2d 732, Southern District of West Virginia 2003).

There are a variety of nonpoint source activities that are currently regulated by either local, state or federal agencies in Idaho, such as the following:

- Grazing – Soil Conservation Commission (SCC), U.S. Forest Service (USFS), Bureau of Land Management (BLM);
- Agriculture – SCC, Idaho State Department of Agriculture (ISDA);
- Mining – Idaho Department of Lands (IDL), DEQ, USFS, BLM;
- Oil and gas exploration – IDL;
- Logging – IDL, USFS;
- Road development and maintenance – Idaho Transportation Department (ITD), USFS, BLM, county highway districts;
- Land development – local governmental entities;
- Land application of wastewater – DEQ;
- Subsurface sewage disposal – DEQ.

Both Idaho Statutes and Idaho WQS identify designated agencies for specific NPS activities. Designated agencies are supposed to develop or identify the cost effective and practical best management practices for preventing or reducing the amount of pollution generated by nonpoint source activities to a level compatible with water quality goals. Designated agencies in Idaho include:

- Department of Lands (IDL) for timber harvest activities, oil and gas exploration and development, and mining activities;
- Soil Conservation Commission (SCC) for grazing and agricultural activities;
- Transportation Department (ITD) for public road construction;
- Department of Agriculture (ISDA) for aquaculture; and
- DEQ for all other activities.

Although not specifically designated in Idaho statute or rule, the USFS and BLM are responsible for ensuring NPS activities on federal lands are conducted in a manner that is consistent with the Clean Water Act (CWA). DEQ has entered into memorandums of understanding (MOUs) with many of these agencies to establish roles and responsibilities for ensuring NPS activities meet Idaho WQS.

The State of Idaho has also adopted voluntary and mandatory best management practices for NPS activities (Table 1). It is the responsibility of the designated agencies (or federal agencies) to ensure that the mandatory BMPs are implemented for activities under their purview. In the absence of voluntary or mandatory BMPs, NPS activities are supposed to

be conducted in a manner that demonstrates a knowledgeable and reasonable effort to minimize resulting adverse water quality impacts.

Table 1. Approved Best Management Practices.

Best Management Practices	IDAPA	Designated Management Agency	Voluntary/Mandatory
Rules Pertaining to the Idaho Forest Practices Act	20.02.01	IDL	Mandatory
Solid Waste Management Rules	58.01.06	DEQ	Mandatory
Individual/Subsurface Sewage Disposal Rules	58.01.03	DEQ	Mandatory
Stream Channel Alteration Rules	37.03.07	IDWR	Mandatory
Rules Governing Exploration and Surface Mining in Idaho	20.03.02	IDL	Mandatory
Dredge and Placer Mining Operations in Idaho	20.03.01	IDL	Mandatory
Rules Governing Dairy Waste	02.04.14	ISDA	Mandatory
Idaho Agriculture Pollution Abatement Plan	58.01.02	SCC	Voluntary

IDL – Idaho Department of Lands; DEQ – Idaho Department of Environmental Quality; IDWR – Idaho Department of Water Resources; ISDA – Idaho Department of Agriculture; SCC – Idaho Soil Conservation Commission

In addition to State agencies, local governmental entities (e.g. cities, counties, highway districts) have required nonpoint source activities within their jurisdiction to implement BMPs. For example, the City of Boise adopted a stormwater management and discharge control ordinance that requires, among other things, implementation of stormwater BMPs. It may be prudent (or required) for DEQ to have assurance that all of these local, mandatory BMPs are being implemented within the review area prior to authorizing a lowering of water quality.

It is clear that Idaho regulates a variety of NPS activities through application of mandatory BMPs. Thus, if mandatory BMPs for NPS activities are not or will not be implemented within the area being reviewed, then DEQ could not authorize degradation from a new or increased discharge.

It is also clear that Idaho has voluntary BMPs and strongly encourages landowners to implement them (e.g. the agricultural pollution abatement plan). Whether DEQ could authorize degradation from a point source when voluntary BMPs are not being implemented is unclear, although the likely answer is “yes, DEQ could authorize degradation.”

Proposed approach for rule

The preliminary draft rule language does not provide any details regarding how DEQ will ensure all reasonable and cost-effective BMPs are being achieved by NPS in the area of concern. Rather, we recommend these details be provided in antidegradation implementation guidance. DEQ needs to establish procedures or criteria for determining whether BMPs are being implemented satisfactorily.

It is the responsibility of the discharger to work with the federal, state and local agencies to assess whether NPS activities within the review area are implementing the mandatory BMPs for those parameters of concern. The applicant should prepare a summary of their findings for DEQ to review.

Summary of Other States

Washington

- Their rules state that one of the purposes of antidegradation is to, “Ensure that all human activities that are likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).”
- They don’t mention this in the Tier II guidance, so it is unclear how it is implemented during a Tier II review process.
- There is no mention of assessing whether existing point sources are complying with their discharge permits.
- There is no mention of reviewing BMP implementation for NPS activities.

Oregon

- Their rules do not specifically mention achieving appropriate controls for point and nonpoint source activities.
- Oregon does require that a new discharger employ the best available technology economically achievable; however, Oregon rules don’t appear to require existing discharges to employ this technology prior to allowing a new/increased discharge to lower water quality.
- Oregon antideg rules are currently under legal challenge

Nevada

- Nevada requires that the new or increased source of pollution implement the highest and best degree of waste treatment available under existing technology, consistent with the best practice in the particular field under the conditions applicable, and reasonably consistent with the economic capability of the project or development.
- Although not in rule, their Continuing Planning Process document indicates that Nevada will assure that highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source controls are implemented. We did not find any additional details about how this is done.

Utah

- Rules state that all new and existing point sources achieve all statutory and regulatory requirements for all new and existing point sources and all required cost-effective and reasonable best management practices for NPS control in the areas of the discharge.
- Rules further state: “If point sources exist in the area that have not achieved all statutory and regulatory requirements, the Executive Secretary will consider whether schedules of compliance or other plans have been established when evaluating whether compliance has been assured. Generally, the “areas of the discharge” will be

determined based on the parameters of concern associated with the proposed activity and the portion of the receiving water that would be affected.”

Wyoming

- Rules have the basic concept of ensuring existing PS and NPS achieve all appropriate controls.
- Guidance introduces a concept of the “zone of influence” which is determined on a case-by-case basis and will depend on the parameter of concern, the characteristics of the receiving water body, and other factors.
- Guidance indicates that if a point source is not complying with their WYPDES permit, then Wyoming may conclude that the point source has not achieved its statutory and regulatory requirements. Schedules of compliance may be taken into consideration meaning that as long as there is reasonable assurance of future compliance, then the lowering of water quality due to a new or increased discharge may be allowed.

Montana

- Rules state that if degradation of high quality waters is allowed, the department will assure that within the USGS hydrologic unit upstream of the proposed activity, there shall be achieved the highest statutory and regulatory requirements for all point and nonpoint sources. This assurance will be achieved through ongoing administration by the department of mandatory programs for control of point and nonpoint discharges.

**Conducting the Antidegradation Analysis for Tier 2 Waters,
Alternatives Analyses as a Requirement for Determining Necessity of Degradation**
Excerpts from Tetra Tech's June 22, 2007 *Technical Memorandum #2—Stormwater Nondegradation
Analysis Project* prepared for the Minnesota Pollution Control Agency

CONDUCTING THE ANTIDEGRADATION ANALYSIS FOR TIER 2 WATERS

EPA outlines the conceptual approach for conducting an antidegradation review and approving a lowering of water quality in Tier 2 waters in its 1994 *Water Quality Standards Handbook*:

In "high-quality waters," under 131.12(a)(2), before any lowering of water quality occurs, there must be an antidegradation review consisting of: a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located (this phrase is intended to convey a general concept regarding what level of social and economic development could be used to justify a change in high-quality waters); full satisfaction of all intergovernmental coordination and public participation provisions (the intent here is to ensure that no activity that will cause water quality to decline in existing high-quality waters is undertaken without adequate public review and intergovernmental coordination); and assurance that the highest statutory and regulatory requirements for point sources, including new source performance standards, and best management practices for nonpoint source pollutant controls are achieved (this requirement ensures that the limited provision for lowering water quality of high quality waters down to "fishable/ swimmable" levels will not be used to undercut the Clean Water Act requirements for point source and nonpoint source pollution control; furthermore, by ensuring compliance with such statutory and regulatory controls, there is less chance that a lowering of water quality will be sought to accommodate new economic and social development).

Two key issues have emerged regarding Tier 2 antidegradation policy and implementation methods: which waters are subject to Tier 2 protection, and what is implied by the requirement that degradation of high-quality waters can only be allowed after a demonstration that "allowing lower water quality is *necessary* to accommodate important economic or social development..." (emphasis added). EPA has indicated in guidance and in rulemaking action regarding Kentucky's water quality standards that most waters in a state clearly fall under the Tier 2 category. After disapproving Kentucky's antidegradation provisions for high-quality waters in 1997 because the "the criteria for designating such waters were not sufficiently inclusive," EPA proposed its own set of water quality standards for high-quality waters. A review of the rationale for this decision is instructive:

The Commonwealth's provisions only apply to a limited subset of high quality waters rather than to all waters whose quality is better than the levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water. Kentucky's approach limits the use of the special protections for high quality waters to the Commonwealth's exceptional waters category which comprise just 1.35 percent of all its waters. However, Kentucky's 1998 305(b) Report shows that approximately 67 percent of the Commonwealth's unassessed waters are candidates for the high quality water protections. This pattern is confirmed by recent intensive watershed sampling in the Kentucky, Salt and Licking River basins, as well as data from random statewide aquatic life biological sample in Wadeable streams conducted by the Kentucky Division of Water over the last two years. This recent sampling shows that approximately 60 percent of the sites fully support their designated uses. The above information and analysis show that the eligibility criteria adopted by the Commonwealth for the exceptional waters category results in only a relatively small percentage of surface waters receiving the protection of the high quality water provisions at 401 KAR 5:029 section 1.(2). Therefore, EPA determined that Kentucky's exceptional waters category does not include other waters whose quality exceed levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water, as required in 40 CFR 131.12(a)(2). In addition, Kentucky's implementation procedures for the use protected category (401 KAR 5:030 section 1.(4)) do not require that the Commonwealth evaluate the necessity of lowering water quality, even though this category does include high quality waters.

Other EPA guidance on how to judge the *necessity of lowering water quality* has been issued, some of which alludes directly or indirectly to the need for some type of alternatives analysis to determine whether or not there are options that might not result in lowered water quality. The *Water Quality*

Standards Handbook (1994) notes that “EPA’s regulation also requires maintenance of high-quality waters except where the [s]tate finds that degradation is “necessary to accommodate important economic and social development in the area in which the waters are located.” (Emphasis added in handbook.) The chapter goes on to note that EPA “believe(s) this phrase should be interpreted to prohibit point source degradation as unnecessary to accommodate important economic and social development if it could be partially or completely prevented through implementation of existing State-required BMPs.”

Appendix G of the handbook, *Questions and Answers on Antidegradation* (August, 1985), states that allowances for lowering the quality of high-quality waters is “intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for the “fishable/swimmable” water, and the two cannot both be achieved. The burden of demonstration on the individual proposing such activity will be very high.”

However, the federal antidegradation rule does not mandate implementation of *any* feasible alternative, regardless of cost. The *Water Quality Guidance for the Great Lakes System: Supplementary Information Document* (USEPA 1995) indicates that generally, if a wastewater treatment plant expansion is needed, up to a 10 percent construction cost increase should be considered an appropriate cutoff to determine if degradation is *necessary*. Little guidance is available on what might constitute “important... social development” in terms of approving a lowering of water quality.

Georgia Court Mandates Higher Treatment Levels to Protect Water Quality

Late in 2004, the Georgia Supreme Court overturned the issuance of an NPDES permit to a Gwinnett County wastewater treatment plant based on the state Environmental Protection Division’s (EPD) failure to use the antidegradation review to require higher levels of treatment (*Hughey et al v. Gwinnett County et al*, Case S04G0873, November 23, 2004). The original permit authorized the F. Wayne Hill Water Resources Center in Gwinnett County to discharge up to 40 million gallons per day of treated wastewater into Lake Lanier. A consortium of environmental groups challenged EPD’s issuance of the permit in several venues, eventually reaching the state Supreme Court. One aspect of the case involved the question of who had the burden of proof in demonstrating that a permit complied with antidegradation rules, the permittee, the state permit-issuing authority, or challengers to the permit. The court held that the permit applicant bore the burden of proof with EPD during the permit application process, but, after the permit’s issuance, the challengers were required to demonstrate that EPD’s conclusion was incorrect.

In ruling on whether the state permitting agency (EPD) conducted a proper antidegradation review, the court held that the permitted discharge would degrade water quality in Lake Lanier but that EPD had demonstrated that the degradation was justified to provide several economic and social benefits. The court held that the permit was supported by the need for additional wastewater capacity due to the projected population growth, that sufficient land was not available for the land application of the wastewater, and that the cycling of treated wastewater from the Chattahoochee River system would aid negotiations concerning an interstate compact regarding the waters. Finally, the Supreme Court ruled that the antidegradation regulations prohibited Gwinnett County from discharging water that is more polluted than it reasonably needs to be by virtue of the plant’s existing technology. The court held that Gwinnett County presented no evidence that it would be impracticable or infeasible for it to use the full technology available at its plant to treat the water before discharging it to Lake Lanier. The court held that the antidegradation regulation did not contain any exceptions that allowed the *convenience of the parties* or *fear of regulatory violations* as justifications for greater water degradation. The court held that the permit must require Gwinnett County to meet the highest and best level of treatment practicable. Because the permit did not contain such standards, the court held that the permit violated the state antidegradation regulations.

The Region 8 *Antidegradation Implementation* guidance contains a very detailed approach that is consistent with the above principles, for the most part, but provides a significant level of information regarding the process for reviewing antidegradation submittals and calculating both the water quality impacts and economic and social benefits. The *data requirements* section on Tier 2 reviews provides some insight into how the Region views the process and the distribution of work involved:

EPA Region VIII believes that implementation of antidegradation tier 2 requirements need not pose an undue burden on the state and tribal agencies charged with administering surface water quality programs. The model antidegradation procedure included in this guidance has been developed to allow states and tribes to focus resources on significant problems and issues and, where necessary, place the information-gathering burden on the project applicant. With respect to antidegradation tier 2, the Region believes and advocates that, rather than getting unduly “bogged down” with assessing and projecting water quality conditions, state/tribal programs should focus on evaluation of non-degrading and less-degrading alternatives in order to minimize the pollutant loadings that will result from the proposed activity. By focusing on the projected pollutant loadings and costs associated with each available alternative, such alternatives analyses can occur independent of the analysis of receiving water quality conditions. The Region believes that evaluation of alternatives is the proper focus on tier 2 reviews, and has developed the model procedure to achieve this focus. To this end, the model procedure:

- 1) includes an initial presumption that all surface waters are high quality and subject to tier 2 review requirements;
- 2) allows for basing high quality determinations on ancillary data such as land use information, presence of sources, biological health, etc.
- 3) establishes a low threshold or definition of “significant degradation;”
- 4) allows for determinations of significance based on simple analyses and factors which do not require modeling (such as percent change in source loadings);
- 5) provides for by-passing the significance test entirely where reasonable alternatives to lowering existing water quality are clearly available; and
- 6) allows for the data-gathering burden to be placed on the project applicant with respect to any data that may be needed to make the high quality and significance findings.

ALTERNATIVES ANALYSES AS A REQUIREMENT FOR DETERMINING NECESSITY OF DEGRADATION

The Minnesota nondegradation policy for significant discharge lists three factors that must be considered in making a determination whether additional control measures can reasonably be taken to minimize the impact of the discharge:

1. The importance of economic and social development impacts of the project
2. The impact of the discharge on the quality of the receiving water
3. Cumulative impacts of all new or expanded discharges on the receiving water

This section addresses the implementation procedures for number 1 above, finding that the lowering of water quality is necessary to accommodate important development. EPA has endorsed alternatives analyses as an integral part of antidegradation reviews for many years. At the outset of this discussion, it is important to note that none of the states surveyed required alternatives analyses as a part of antidegradation review for stormwater permits. This is because of the fact that alternatives analysis is part of a Tier 2 review, and no states have conducted such a review for stormwater permits.

As its proposed rule for *Water Quality Standards for Kentucky*, issued on November 14, 2002, EPA notes that

EPA considers pollution prevention and enhanced treatment alternatives analyses as an appropriate starting point and of particular importance in an antidegradation review for both industrial and municipal dischargers. Given the variety of engineering approaches to pollution control, a number of options are available that could reduce or eliminate the anticipated lowering of water quality. Some of these include substituting less-toxic or less-bioaccumulative chemicals for the toxic or bioaccumulative chemical. Another approach could involve water conservation to reduce the overall volume of waste water and possibly reduce pollutant mass loadings. Other approaches could include more careful control of the materials in the process stream, the recycle or reuse of waste byproducts, and operational changes to reduce the quantities of waste. (The state) would need to make a determination that an alternative or combination of alternatives is cost-effective. If cost-effective pollution prevention alternatives are available, there would be no need for the lowering of water quality.

States have developed a two-step process to generate findings of necessity regarding activities that propose to lower water quality. One process addresses necessity through an alternatives analysis, while the other addresses the importance of the social and economic development that the proposed activity supports. Although the Minnesota antidegradation policy does not explicitly require an alternatives analysis, such a requirement is implied in the finding of *necessity*. The following sections provide an overview of the differing approaches to alternatives analysis; give examples from several states; and discuss the topics that should be included in regulations and implementation guidance to allow the Minnesota Pollution Control Agency (MPCA) and the applicant to sufficiently address the finding of necessity to allow degradation of a Tier 2 surface water.

Most antidegradation implementation documents reviewed by Tetra Tech include a Tier 2 alternatives analysis. The differences in states' approaches to alternatives analysis include (1) what triggers the alternatives analysis; (2) when the analysis is conducted in relation to the social and economic analysis (SEA); (3) the finding or decision made after the alternatives analysis; and (4) the level of analysis required.

States require alternatives analysis based on a determination of degradation as defined by the individual state's definition of degradation; this definition—or trigger—varies. Some states use a case-by-case evaluation of increased loading, increased concentration, decreased assimilative capacity, and so on. Others use a de minimis test or rule of thumb such as a 5 percent or 10 percent decrease in the assimilative capacity as measured from baseline water quality. After a finding that the proposed activity would cause or would likely cause degradation to a Tier 2 surface water, an alternatives analysis is triggered. Some states require an alternatives analysis before the SEA; some incorporate the alternatives analysis into the SEA, and one state requires it after the SEA is completed.

Another key difference in states' approaches to alternatives analysis is the finding or decision regarding necessity. In some states, if the applicant identifies a cost-effective, reasonable alternative or alternatives, the least degrading of these alternatives must be used or the permit application is denied. In other words, the state determines at this point that the degradation of the Tier 2 water is not necessary and does not allow the applicant to conduct SEA to justify the project. Other states do allow SEA even if reasonable alternatives are identified. This approach considers the findings from the alternatives analysis along with the findings from the SEA before making a final determination of the necessity of the proposed degradation.

Finally, states differ in the level of detailed and rigorousness required for the alternatives analysis. Most states simply list the categories of alternatives that must be considered and criteria that will be used by the state in its evaluation of the submittal. Some states provide much more detail in their expectations of what the alternatives analysis should include, such as what should be included in the cost of the alternatives and cost methods to use in the analysis. Another approach employed by one state is to be

very general and to place an emphasis on not burdening the applicant with detailed analysis. Below are summaries of the approaches taken in selected states.

Delaware

Delaware requires an alternatives analysis after a determination that the activity will likely cause significant degradation. This determination is based on a review of nine significance factors. Significance can be demonstrated with respect to any one (or combination) of the factors. It is also based on a general guideline that the proposed activity would lower by more 5 percent available assimilative capacity or increase pollutant loadings to the segment by more than 5 percent.

The *Antidegradation Implementation Guidance* document lists nine types of alternatives that the applicant must consider: pollution prevention; reduction in the scale of the project; water recycling or reuse; process changes; innovative treatment technology; advanced treatment technology; seasonal or controlled discharges to avoid critical water quality periods; improved operation and maintenance of existing treatment systems; and alternative discharge locations.

If the state makes a preliminary determination that one or more reasonable alternatives to allowing the degradation exist, the state works with the project applicant to revise the project design. As a nonbinding rule of thumb, nondegrading or less-degrading pollution control alternatives with costs that are less than 110 percent of the costs of the pollution control measures associated with the proposed activity are considered reasonable. If a mutually acceptable resolution cannot be reached on the alternatives, the state documents the alternatives analysis findings and a public notice a preliminary decision to deny the activity. If no reasonable alternatives exist, the antidegradation review continues with a determination of social and economic importance.

West Virginia is very similar to Delaware in its approach. However, it uses a different definition of degradation: significant degradation is use of 10 percent of the available assimilative capacity as measured from baseline water quality or 20 percent of the remaining assimilative capacity when considering cumulative impacts.

Pennsylvania

Pennsylvania requires special pre-permit analysis for proposed discharges into high-quality, Tier 2 waters. Alternatives to new, additional, or increased point source discharges to surface waters must be employed where they are cost-effective and environmentally sound. This requirement is called the nondischarge alternatives analysis. If a nondischarge alternative is not cost-effective and environmentally sound, the proposed discharger must use the best available combination of cost-effective treatment, land disposal, pollution prevention, and wastewater reuse technologies. This process is known as the anti-degradation best available combination of technologies (ABACT) and establishes a minimum level of performance for the discharger.

The state then requires an analysis to determine if nondegrading discharge alternatives exist. If the ABACT produces a nondegrading discharge, the discharge can be approved for the Tier 2 water. If it would produce a degrading discharge, a Social or Economic Justification (SEJ) Analysis is required before it could be used. The SEJ Analysis determines the approvable level of treatment technologies and the final determination of *cost-effectiveness* is not made until the SEJ analysis is complete. If the SEJ analysis has not demonstrated economic or social importance of the activity, the only approvable discharge would be one that is nondegrading.

Oregon

The state prohibits a lowering of water quality in Tier 2 waters unless all the following apply:

- All water quality standards will be met and beneficial uses protected
- No other reasonable alternatives exist
- The lowering of the water quality is necessary for social and economic benefits that outweigh the environmental costs

If the proposed activity would likely result in any measurable change in water quality away from conditions unimpacted by anthropogenic sources, then the proposed activity is considered to likely result in the lowering of water quality. The *measurable change* is based on any of the following (a) percent change in ambient concentrations at appropriate critical periods, (b) the difference between current ambient conditions and conditions that would result if the activity is allowed, (c) percentage change in loadings, (d) percent reduction in assimilative capacity; (e) nature, persistence, and potential impacts on aquatic biota, and (f) degree of confidence in modeling used.

In the alternatives analysis, the applicant must provide a discussion of the technical and economic feasibility of the alternatives. If at least one of the alternatives to lowering the water quality is technically and economically feasible, the applicant “should pursue that alternative rather than the activity that results in a lowering of water quality. If a technically, economically alternative does not exist, the antidegradation review continues to the analysis socioeconomic benefits vs. environmental costs.

Finally, Pennsylvania and West Virginia provide a very useful level of detail in their implementation guidance for alternatives analysis. Below is a description of topics covered in their guidance:

- A discussion of when alternatives analysis is required.
- A listing and description of nondegrading and less-degrading pollution control measures to consider (Pennsylvania also includes environmental consideration for each method).
- Identification of cost components and assessment of costs. This provides a consistent approach for the cost analysis by listing cost categories that may and may not be included in the analysis and the cost formulae to use.
- Evaluation of environmental impacts associated with the alternatives. This discusses the types of impacts that the applicant must address, at minimum.
- Cost and reasonableness criteria for alternatives evaluation.
- The procedure for comparing costs of various alternatives.
- A summary of the alternatives analysis process. This includes a description of how the findings of the analysis will be used in the overall antidegradation review and permitting process.

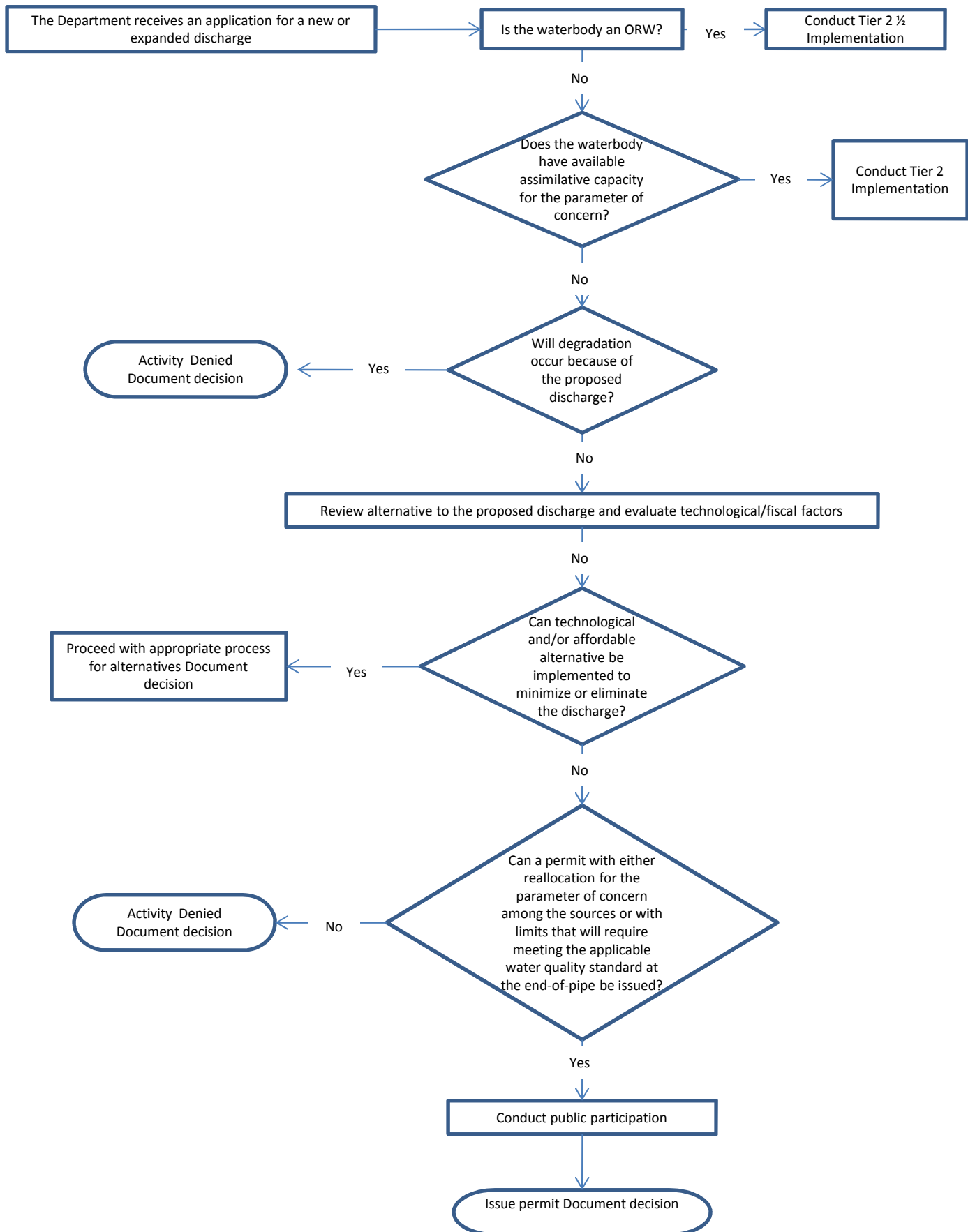
District Court Rules on West Virginia Antidegradation Procedures

The U.S. District Court in Huntington, West Virginia, issued a ruling in 2003 that addressed a range of issues related to the West Virginia antidegradation implementation program (*Ohio Valley Environmental Coalition, et. al. v. Marianne Lamont Horinko, Acting Administrator, United States Environmental Protection Agency*; Civil Action No. 3:02-0058). Among the key decisions rendered in the ruling are the following:

- The designations of certain waterbody segments for Tier 1 antidegradation protection only is not permissible, especially when monitoring data does not indicate that water quality fails to exceed levels necessary to support wildlife and recreation.
- Allowing exceptions to antidegradation reviews for publicly owned wastewater treatment plants as long as there is net decrease in the overall pollutant loading was deemed to be arbitrary and capricious.
- Requiring Tier 2 antidegradation reviews for discharges under CWA section 402 and 404 general permits only at the time of general permit issuance was deemed to be arbitrary and capricious.
- Rules that state that nonpoint sources will be deemed to be in compliance with antidegradation regulations if best management practices are installed and maintained are reasonable.
- EPA's approval of the section in the antidegradation regulations that provides that "[w]ater segments that support the minimum fishable/swimmable uses and have assimilative capacity remaining for some parameters" shall only "generally" be provided Tier 2 protection was arbitrary and capricious.
- EPA's approval of a provision that allows for a 10 percent reduction in the available assimilative capacity of individual pollutant parameters from an individual discharge before Tier 2 review is required was supported by evidence in the record and therefore was reasonable.
- EPA's approval of a provision allows for a twenty percent cumulative reduction from all discharges before Tier 2 review is required was not supported by any evidence in the record and therefore was arbitrary and capricious.
- Approval of trading provisions which can reasonably be read to require that the trade must result in an improvement to water quality in the water segment where the new or expanded discharge is located was reasonable.

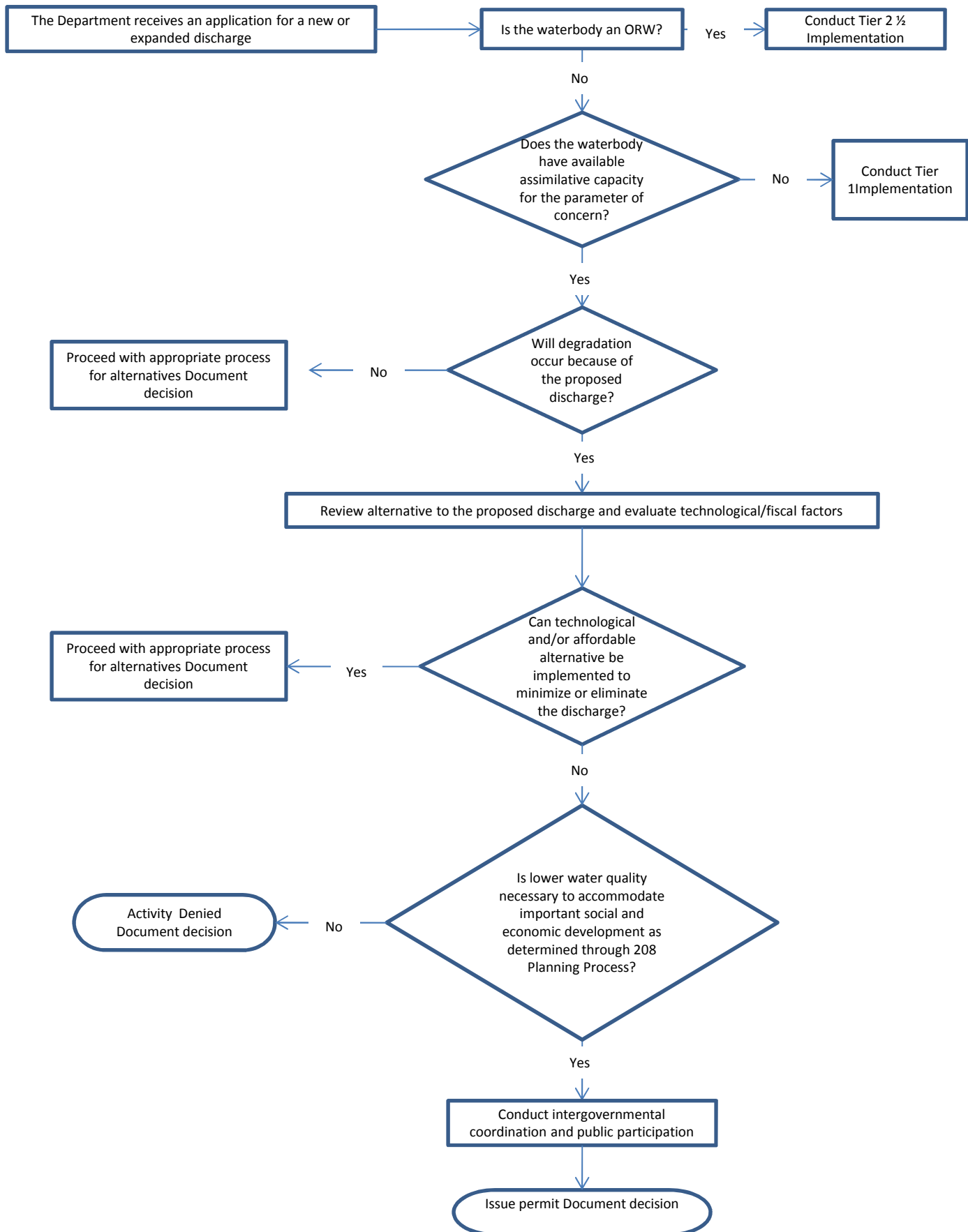
Tier 1 Implementation

Ref5.4



Tier 2 Implementation

Ref5.4



Tier 2 ½ Implementation

Ref5.4

